

**Comments on the
NOSB Aquaculture Working Group Interim Final Report**

Submitted April 9, 2006

By

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Organic certification, based upon sufficiently high environmental standards, is an effective incentive for environmentally responsible aquaculture that will also be productive, profitable and socially beneficial. I have supported the need for US organic aquaculture standards since 1998-1999 when I submitted extensive comments on the NOSB Livestock Committee's first attempt to draft aquaculture standards. This experience stimulated me and Deborah Brister (University of Minnesota) to establish better communication between the organic farming / organic foods community and the aquaculture community by convening the first-ever National Conference on Organic Aquaculture in 2000 at the University of Minnesota. We also convened a International Organic Aquaculture Workshop in 2003 that focused on aquaculture species that feed low on the food chain. Brister also testified to the NOSB and served on a NOSB Aquatic Animal Task Force that submitted a report in 2001. Thus, I am delighted to finally see real progress towards establishing US organic aquaculture standards!

I generally support the recommended standards although I disagree with specific parts. My comments below identify these parts, giving reasons or suggested revisions. The comments begin with my answers to questions 1-7 solicited in the "Item for Public Comment". I strongly support timely revision of the recommended standards based on the public comments received. I urge timely progress through the remaining steps to promulgate organic standards for farmed aquatic animals as an amendment to the Final Rule.

From "Item for Public Comment"

Do the recommended standards:

1. Communicate effectively?
2. Provide clear and adequate context of scope, product coverage, and production systems?
5. Present measurable objectives that are enforceable?
6. Present a clear expectation of targets and goals?

Response to 1, 2 and 6: Yes in most but not all of the text. See suggested revisions and comments below.

3. Identify and address key stakeholders and their concerns and challenges?

Response: there is no explicit identification and addressing of key stakeholders.

4. Include vision and strategy for achieving consistency with organic principles demonstrated in the Organic Foods Production Act of 1990 and its implementing regulations?

7. Suggest a system of production that reduces or minimizes the need for off-farm inputs?

Response to 4 and 7: Yes, except that Option A for § 205.252 **Aquaculture feed** does not minimize off-farm inputs to the same extent that Option B does. Thus, Option B fits best with federal organic principles.

From “Interim Final Report”

Suggested revisions are denoted by underlining for new words and strike-through for deleted words.

EXECUTIVE SUMMARY

...The NOAWG is a private and public sector ad hoc group of approximately 85 individuals interested in advancing organic aquaculture in the United States.

Comment: A number of members of the NOAWG are from public sector institutions; I am only one example.

§ 205.2 Terms defined

Aquatic animal. Any finfish, mollusc, crustacean, or other aquatic vertebrate or invertebrate grown in fresh, brackish or saltwater, except amphibians, reptiles, birds and mammals.

Aquatic plant. Any plant grown in an aquaculture facility, including microscopic or macroscopic algae, and excluding vascular aquatic plants such as watercress, rice, water hyacinth, and hydroponically produced vascular plant crops.

Bivalve molluscs. ~~Molluscan~~ Shellfish species (Phylum *Mollusca*, Class *Pelecypoda* commonly called bivalves) with two outer, hinged shells such as ~~including~~ oysters, clams, mussels and scallops, ~~but not including gastropods and cephalopods.~~

Coldwater and coolwater finfish. Salmonids, cod, marine flatfish and other species not considered in this section as warmwater finfish.

Comment: It would be better to structure this definition similarly to that for warmwater fish, by specifying the temperature range for coldwater finfish and range for coolwater finfish.

Finfish. Aquatic vertebrate animals consisting of the bony fishes (*Telostomi*), which does not include ~~ing~~ mammals, birds, amphibians and reptiles.

Aquatic gastropods. Shellfish species (Phylum *Mollusca*, Class *Gastropoda*) that have a single undivided shell, such as in abalone, or species in which the shell is reduced and internal or absent.

Comment: Existing commercial aquaculture of aquatic gastropods may increase in the future. Certain systems could be ideal candidates for organic aquaculture certification, such as abalone raised in contained units and fed only live marine algae, as well as production of abalone as part of polyculture systems. Future development of organic standards for aquaculture of molluscs should consider gastropods, not solely bivalves.

§ 205.250 Aquaculture general.

(5) Biodiversity of natural aquatic ecosystems, functional integrity of aquatic environments, and the quality of surrounding aquatic and terrestrial ecosystems must be protected....

Comment: The standards should give explicit definitions of “biodiversity”, “functional integrity” and “quality of surrounding ...ecosystems”, unless these are adequately defined in the existing organic rule. Definitions are needed to provide clear expectation of goals and targets and to support measurable objectives that are enforceable.

§ 205.251 Origin of aquaculture animals.

(e) Production of triploid aquatic animals from the application of temperature or pressure shock after fertilization and by crossing tetraploids with diploids is prohibited for fish to be sold as organic.

Comment: What is the logic for this prohibition? The standards should be based on logic supported by credible evidence. This prohibition removes one of the best available tools for protecting “biodiversity of natural aquaculture ecosystems” from escapes of “cultured animals that are species-distinct or genetically-distinct populations from native organisms” (objectives stated in §205.250 (5) and §205.255 (j)). Triploidy induction is one of the most effective biological barriers for a number of aquaculture animals (Tave, 1993; Benfey, 1999; Nell, 2002). It does not add any novel or foreign genes; it does not even alter the frequencies of different genes as traditional breeding does. It simply retains an extra copy of the maternal set of chromosomes; this copy would otherwise degrade after sperm fertilizes the egg. Triploid induction is a low-tech method compatible with even relatively small-scale organic aquaculture operations.

(i)broodstock may be collected from the wild provided that they are collected in a sustainable manner, and where appropriate, in compliance with all applicable federal and state regulations and collaboration with government agencies,....

Comment: Strengthen this to explicitly mention compliance with applicable federal and state regulations, of which there may be quite a few in some cases.

§ 205.252 Aquaculture feed

Under Option A and B

(b) To the greatest practical extent, cultured aquatic animals should be provided their natural foods as closely as possible. This includes live foods and the sources of ingredients in formulated feeds.

Comment: I like the objective but urge you to fix two weaknesses. (1) Clarify the scope of this standard via my suggested new text or something like this. (2) This standard desperately needs a measurable objective for formulated feeds. For instance, it could specify that the protein (amino acid source) and lipid (primary energy source) in the formulated feeds must be derived from the natural foods of the aquatic animals.

Under Option A

(g) (1) (1) Wild fish and other wild seafood, provided that ~~use~~ the amount of such wild fish and wild seafood that goes into feeding the aquaculture animals cannot exceed one pound of wild fish harvested for every pound of cultured aquatic animals ~~cultured~~ at harvest size.

Comment: The standard needs specificity to present a measurable objective that is enforceable. Even with revisions along the lines suggested here, I question the feasibility of enforcing this standard. Numerous factors make it hard to accurately track on a farm-by-farm basis how much wild fish/seafood ingredients actually goes into producing a harvested lot of culture animals. For example, should the weights be tracked as wet weight or dry weights?

Also, how will food conversion be monitored and data aggregated for an entire aquaculture system? The devil is in the details and these details will influence the credibility of efforts to comply with this standards.

Under Option A and B

A(h) and B(e) Organic aquaculture feeds may include fish meal and oil derived from organically raised aquatic animals, providing the meal and oil is produced from fish of a different genus to the target aquaculture species being fed.

Comment: Why does this require a “different genus”? If the objective is to prevent spread of certain diseases, say so and provide the scientific evidence that using a different genus is the appropriate barrier.

A(m) and B(j).Manure, whether composted or not, shall not be applied in aquaculture production systems other than land-based units such as ponds, tanks and raceways.

Comment: Ponds are only one example of land-based units that have solid bottoms and sides which will hold in the applied manure. Some aquaculture systems apply manure to static water tanks and could be good candidates for organic aquaculture. Whatever land-based unit is used, the aquaculture producer will want to maintain static water or very low flow conditions in order to retain the nutrients from the manure and comply with water quality regulations for effluents.

EXPLANATIONS (for aquaculture feed)

Mammalian and Poultry Slaughter By-products

Comment: To assure internal consistency of the standards, the main ingredients in formulated feeds should comply with the stipulation in § 205.252 (b) to provide cultured animals with “their natural foods as closely as possible”. Thus, I do not support using mammalian and poultry slaughter by-products unless the aquaculture species would naturally eat such a source of food, for instance if it sometimes scavenges on carcasses of small mammals. Likewise, I do not support using plant protein ingredients as major feed components for exclusively carnivorous aquatic species. I could accept using quite small amounts of non-natural foods, for instance to provide binders for the feed pellets.

§ 205.253 Aquaculture health care

(a)(2) Provision of a source of nutrition ~~or~~ inclusive of live and formulated feeds sufficient to meet nutritional requirements,....

(a)(7) ... or treatment of healthy animals with ~~endemic~~ beneficial bacteria....

Comment: Is it practically feasible and affordable to discriminate beneficial bacteria that are solely ‘endemic’ from those that are non-endemic? This may not be enforceable without requiring the aquaculture producer to apply some very sophisticated and expensive molecular biology methods.

§ 205.255 Aquaculture facilities

(a) Location of organic aquaculture facilities shall minimize disruption of the abiotic and biotic structure and function of ~~take into consideration the maintenance of the aquatic environment and~~ surrounding aquatic and terrestrial ecosystem.

Comment: Original wording did not provide a measurable objective that is enforceable. Revised wording allows numerous options for quantitative monitoring using standards methods of aquatic ecology.

(e) Pond berms and tank tops shall be at sufficient elevations to prevent contamination from the environment and escapes of cultured animals during floods.

(f) Potentially adverse environmental impacts from aquaculture production must be minimized. The rate of effluent discharge must not exceed the natural assimilative capacity for inorganic and organic compounds of an area within 25 meters of the site boundary nor contribute significantly to ~~environmental degradation of water quality and natural habitat quality~~ beyond 25 meters of the site boundary.....

Comment: Revised wording provides measurable objectives that are enforceable, based on monitoring that uses standards methods of water chemistry and aquatic ecology.

(h) Facilities should not significantly impact freshwater or seawater quality or supply and should not salinize or otherwise contaminate soils.

(k)Monitoring shall be employed to ensure that the natural assimilative capacity for inorganic and organic compounds at the site is not overburdened.

Comment: Revised wording provides measurable objectives that are enforceable.

(m) Production systems with containment vessels of plastic, fiberglass, metal or concrete surfaces are allowed provided that a conversion period of one year or one crop cycle, whichever is less, occurs under organic management before production can be certified organic.

Comment: Please clarify whether brand-new vessels (not yet used in any kind of production) can be used immediately. It seems they should not require a conversion period.

(n) Recirculating systems....

(n)(1) minimization of disease organisms being introduced vertically through eggs or otherwise from parents, from water inflows, from feeds, from vectors including birds, and humans, or other sources.

Comment: This standard should apply to all organic aquaculture systems, not just recirculating ones.

(n)(2) ...toxic metabolic compounds (ammonia, carbon dioxide, nitrite, nitrate etc.),... and with sufficient ~~dewatering and rewatering~~ percent water replacement to prevent accumulation of toxic compounds.

Comment: ‘dewatering and rewatering’ are odd terms here and give wrong impression that the aquatic animals regularly experience periods without water. Recirculating systems do regularly replace a small percentage of their total water with new incoming water.

(n)(4) stocking density levels that take into consideration animal health and overall well-being, including the natural ~~schooling~~ behavioral characteristics of the species.

Comment: Better to refer generally to natural behavior because different aquaculture species have widely different behaviors. For example, some finfish school while others are territorial and definitely do not school together.

§ 205.258 Farmed aquatic plants

(b)(2) such culture media shall be disposed of in a manner that does not ~~adversely impact upon the~~ degrade water quality, soil quality and biological diversity in the receiving environment.

Comment: Revised wording provides measurable objectives that are enforceable, whereas original wording was much too vague to allow this.

§ 205.259 Harvest, transport, post harvest handling, and slaughter of aquatic animals

(b) Harvest operations must cause minimal disturbance to the abiotic and biotic structure and function of the natural environment.

Comment: Revised wording provides measurable objectives that are enforceable.

(f)(iv) ice slurry for warmwater marine finfish; provided that this method will be only permitted for five years after the date when organic standards for farmed aquatic animals are promulgated as an amendment to the Final Rule.

Comment: Why is this five year grace period needed for this one sector of producers?

References Cited

Benfey, T. 1999. The physiology and behavior of triploid fishes. *Reviews in Fisheries Science* 7(1):39-67.

Nell, J. 2002. Farming triploid oysters. *Aquaculture* 210:69-88.

Tave, D. 1993. *Genetics for Fishery Hatchery Managers*. Second Edition. AVI, Van Nostrand Reinhold, NY.